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(56) Documents Cited
GB 2243932 A   EP 0817143 A1   EP 0686949 A1
EP 0611124 A2   EP 0404007 A2   WO 98/56197 A
WO 97/19429 A1   WO 96/21205 A1   WO 96/11454 A1
US 5828313 A   US 5087905 A

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(54) Abstract Title
Image display for mobile phones

(57) A personalised facial image is constructed by the addition and subtraction of a number of image templates selected from a series of image templates (I1, I2 , I3, ...In) stored in the memory of a mobile phone. The construction of the image is in accordance with a unique control signal. Each unique control signal has parameters for the construction of an image of one particular person. The control signal, consisting of only small amounts of data can be included in calls to allow the identity of a caller to be established. On receipt of the control signal, the caller's facial image is constructed from a repertory of image templates and is shown on the display of the phone receiving the call.
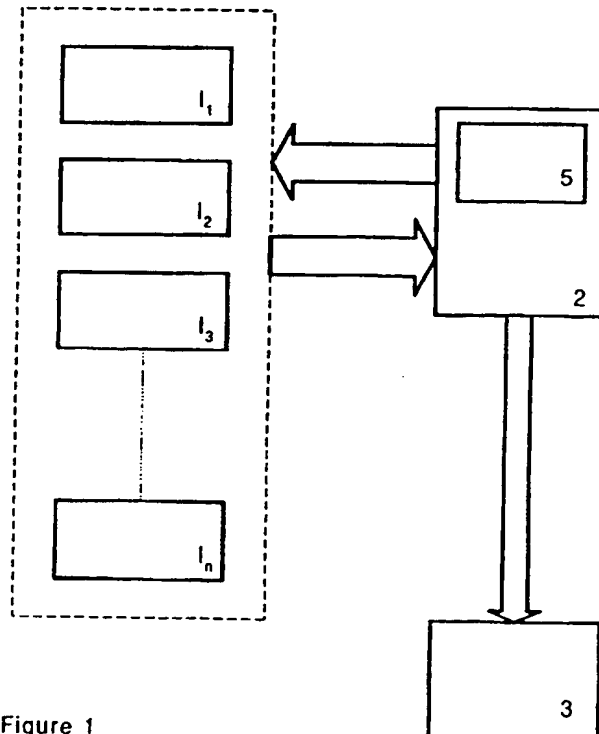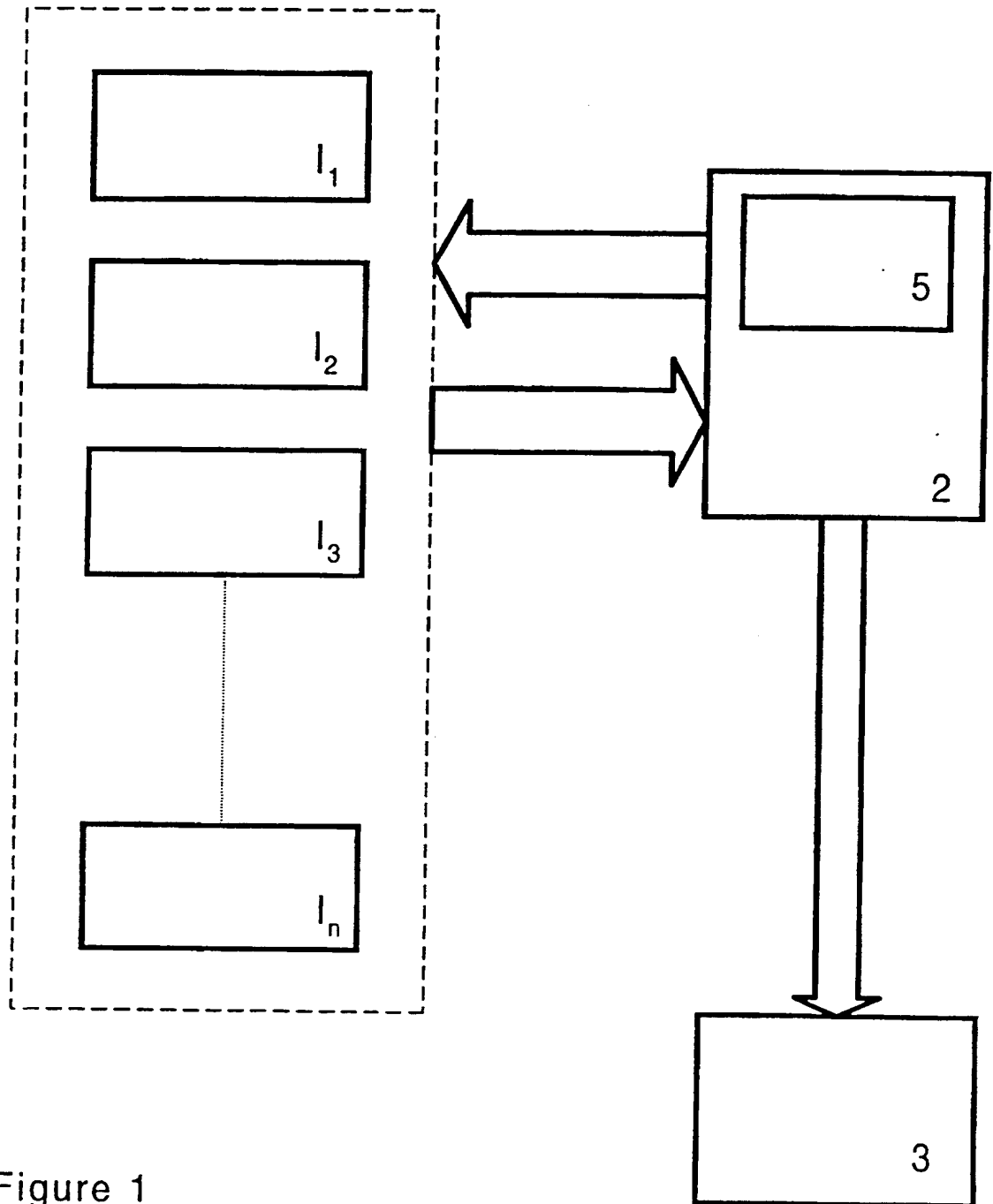

Figure 1

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Figure 1

Figure 2

COMPACTER PLC

CONGLOMERATE

CONSOLIDATED

T1

.................310   + 5

.................120   - 1

.........112

T2

COMPACTER PLC   310   + 5

CONGLOMERATE   120   -1

CONSOLIDATED   111

D1

Image display for mobile phones.

This invention relates to mobile phones and in particular it relates to mobile phones with means for display of selected images.

Transmission of a still or fixed image normally requires a relatively large bandwidth. The use of a visual calling person display is disclosed in US 5 761 279 to Bierman et al. , however, for which only a small amount of data need be transmitted to achieve a selected facial image. The Bierman patent makes use of data compression techniques to provide a centralised store of facial images retrievable on the basis of a calling party's number.

Researchers at the University of Kent in Canterbury have reported development of a method of storage for facial images using a series of templates. The stored facial image may be recreated by means of an ordered compilation of the templates.

The capacity of memories available as components for telephone use continually increases and is accompanied by price reductions. The current trend is for memory to double in capacity over a three year period whilst a constant price is maintained. The transmission of data over the air interface is still restricted (e.g. to 9.6 Kbits per second for GSM) and the costs associated with data transmission are not expected to be reduced significantly.

The availability of higher capacity memory for use in mobile phones allows novel and more flexible use of data and in particular maximum use of data transmitted over-the-air.

It is an object of the present invention to provide means for simple provision of a variety of useful images at the user interface of a mobile phone. It is a further object of the invention to provide selected images on the display of a mobile phone by means of data transmitted over the air interface in small amounts and at relatively low data rates.

According to the invention there is provided a mobile telephone programmed to operate under the control of a CPU, having a visual display and a repertory of image templates stored in memory, from which repertory of image templates ordered compositions provide selected images on the visual display.

Examples of the invention will now be described with reference to the figures in which:

figure 1 is a functional block diagram of an image transfer device,

figure 2 is a simplified decomposition of a display into templates.

With reference to figure 1 a mobile telephone contains a memory 1, processor 2 and a visual display unit 3. The memory 1 has a series of image templates stored and these image templates are represented in figure 1 as I_1, I_2, I_3 ..I_n . An image control signal at 4 is input to processor 2.

The image control signal $I_{control}$, where

$$I_{control} = I_1, \; I_2C_2, \; I_3C_3 \; ..I_nC_n,$$

has a series of template identifiers and contains also a series of coefficients, $C_2, C_3 \; ..C_n$ with at least one coefficient for each of the templates other than the first template I_1.

On receipt of the image control signal 4, template I_1 is selected by the processor 2 and template I_2 is then added to or subtracted from template I_1 to form an image profile 5 in processor 2. Image profile 5 differs from both image template I_1 and image template I_2. Addition of I_2 to I_1 or subtraction of I_2 from I_1 is determined by the coefficient C_2 contained in the control signal 4 for template I_2. The next image template I_3 is then selected and is added to or subtracted from image profile 5 in accordance with the coefficient C_3 for image template I_3 contained in the image control signal 4.

Each image template $I_2, I_3 \; ..I_n$ within the repertory of image templates is selected in sequence gradually to modify, by an ordered compilation of image templates, image profile 5. Each successive image template is added to, subtracted from or ignored by image profile 5 in accordance with its coefficient as contained within the image control signal 4. The resultant image profile 5 is then displayed on visual display unit 3.

In this example, the first image template is a general representation of a human face. Addition of image template 2 to image template 1 will modify the general human face of image template 1 to make the image appear more

masculine. Subtraction of image template 2 from image template 1 will provide an image which appears to be a more feminine image.

Successive templates are included in the image, or ignored, in accordance with the coefficients assigned to each template by the image control signal. In this manner closer and closer approximations to the required image are achieved. An image control signal of approximately 50 bytes can therefore trigger the generation an image clearly recognizable on visual display unit 3 as a particular human face. One such image may be the facial image of the person making the call to a mobile phone.

The image control signal 4 may be supplied from a number of sources and may be conveniently a signal or sequence of signals received by the telephone across the air interface.

The caller will need to have saved in memory and to transmit, the image control signal descriptive of the required image. In order to transmit his own facial image for example, the caller need not have the image display facility within his own phone but need have stored only the control signal descriptive of his own image.

A set of templates capable of providing, through ordered compositions, the required images may be entered into the memory of the phone by various means. It is anticipated that a set of templates for facial images and the personal control signal for the purchaser might best be entered into the phone at the point of sale. The generation of the purchaser's "identikit" image and

its descriptive control signal would require a specially adapted computer and some skill from the operator of the computer.

In a further example of the use of a set of templates to provide images, at least part of the repertory of image templates stored in memory is compiled from signals received by the telephone over its air interface.

For many information displays, the larger part of the display is taken up with items of information which do not change or change infrequently. Displays of stock market prices or football scores for example have the larger part of the display space taken up with the names of the companies or teams to which the prices or scores relate. In order to compile useful displays of mixed current and previously recorded information, some current information must be entered into the image profile.

Conveniently a set of image templates would comprise templates containing both unchanging information for ready display and current information subject to revision. The "current" templates can then be written to with the current information regarding price or score. A combination of the unchanging information and the current information will provide the required display with only a small amount of data transmitted over the air interface at relatively low data rates.

With reference to figure 2, the template T1 shows three imaginary company names which represent the display information unlikely to change. The prices corresponding to the three companies of template T1 are shown in template T2 as current prices and the price change, plus or minus, during the

day. Of the six numbers in template T2 four have been changed to provide the latest prices viz. 310, +5, 120 and -1. A "0" representing no change in the price, such as alongside 111, would not be displayed.

Although the information stored in the templates, or transmitted, may be text or numerals, all displays and corresponding templates are referred to herein as images. The image control signal for the composition of the display D1 for the simplified example of figure 2 would be

$$I_{control} = T_1 + T_2.$$

For templates subject to updating with changes it will be necessary to provide an indication of the time at which the information was amended. The time and nature of the last amendment may be the subject of a separate template so that the times of transmission of the last amendment and the next amendment due for transmission can be included.

Constraints on the size or construction of the display may allow only a limited number of features to be presented simultaneously on the display. The information may then be presented in sequence such that the image control signal would be

$$I_{control} = t_1 (T_1 + T_2), t_2 T_{update}, t_1 (T_{n-2} + T_{n-1} - T_n).$$

where t_1 and t_2 are the times for which the particular display composition is presented and $T_{n-2} + T_{n-1} - T_n$ is a composition from a set of templates other than T_1 and T_2.

Claims

1. A mobile telephone programmed to operate under the control of a CPU, having a visual display and a repertory of image templates stored in memory, from which repertory of image templates ordered compositions provide selected images on the visual display.

2. A mobile telephone as in claim 1 in which the ordered composition of image templates is in accordance with a signal or sequence of signals received by the telephone across the air interface.

3. A mobile telephone as in claim 1 in which the ordered composition of image templates is in accordance with a signal or sequence of signals generated within said mobile telephone.

4. A mobile telephone as in claims 1 to 3 in which a selected image on the visual display is a fixed image.

5. A mobile telephone as in claim 4 in which a selected on the visual display is a facial image.

6. A mobile telephone as in claim 5 in which the facial image is that of the current caller to said mobile telephone.

7. A mobile telephone as in any preceding claim in which at least part of the repertory of image templates stored in memory is compiled from signals received by the telephone over its air interface.

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Amendments to the claims have been filed as follows

1. A mobile telephone programmed to operate under the control of a CPU, having a visual display and a repertory of image templates stored in memory, from which repertory of image templates ordered compositions provide on the visual display facial images of particular human faces.

2. A mobile telephone as in claim 1 in which the ordered composition of image templates is in accordance with a signal or sequence of signals received by the telephone across the air interface.

3. A mobile telephone as in claim 1 in which the ordered composition of image templates is in accordance with a signal or sequence of signals generated within said mobile telephone.

4. A mobile telephone as in claims 1 to 3 in which a selected image on the visual display is a fixed image.

5. A mobile telephone as in any preceding claim in which the facial image is that of the current caller to said mobile telephone.

The Patent Office

INVESTOR IN PEOPLE

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Claims searched: 1-7	**Date of search:** 2 March 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): G4H(HDW); H4L(LECX)

Int Cl (Ed.6): G08B(5/22)

Other: ONLINE: WPI, EDOC

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2243932 A	(CHINESE COMPUTERS LIMITED) See lines 1-12 of page 3 and lines 14 of page 6 to line 16 of page 7, especially.	1,at least.
X	EP 0817143 A1	(NEC) Whole document.	1,at least
X	EP 0686949 A1	(CASIO COMPUTER CO.) Whole document.	1-7, at least.
X	EP 0611124 A2	Lines 14 to 19 of column 2, especially.	1, at least.
X	EP 0404007 A2	(NEC) Whole document.	1, at least.
X,E	WO 98/56197 A	(TELIA) Whole document.	1, at least.
X	WO 97/19429 A1	(MOTOROLA) Whole document.	1-7, at least.
X	WO 96/21205 A1	(MOTOROLA) Whole document.	1, at least.
X	WO 96/11454 A1	(PHILIPS) Whole document.	1-7, at least.
X	US 5828313	(NEC) Whole document.	1, at least
X	US 5087905	(NEC) Whole document.	1, at least